

## AXIS P5654-E Network Camera

## User Manual

# AXIS P5654-E Network Camera

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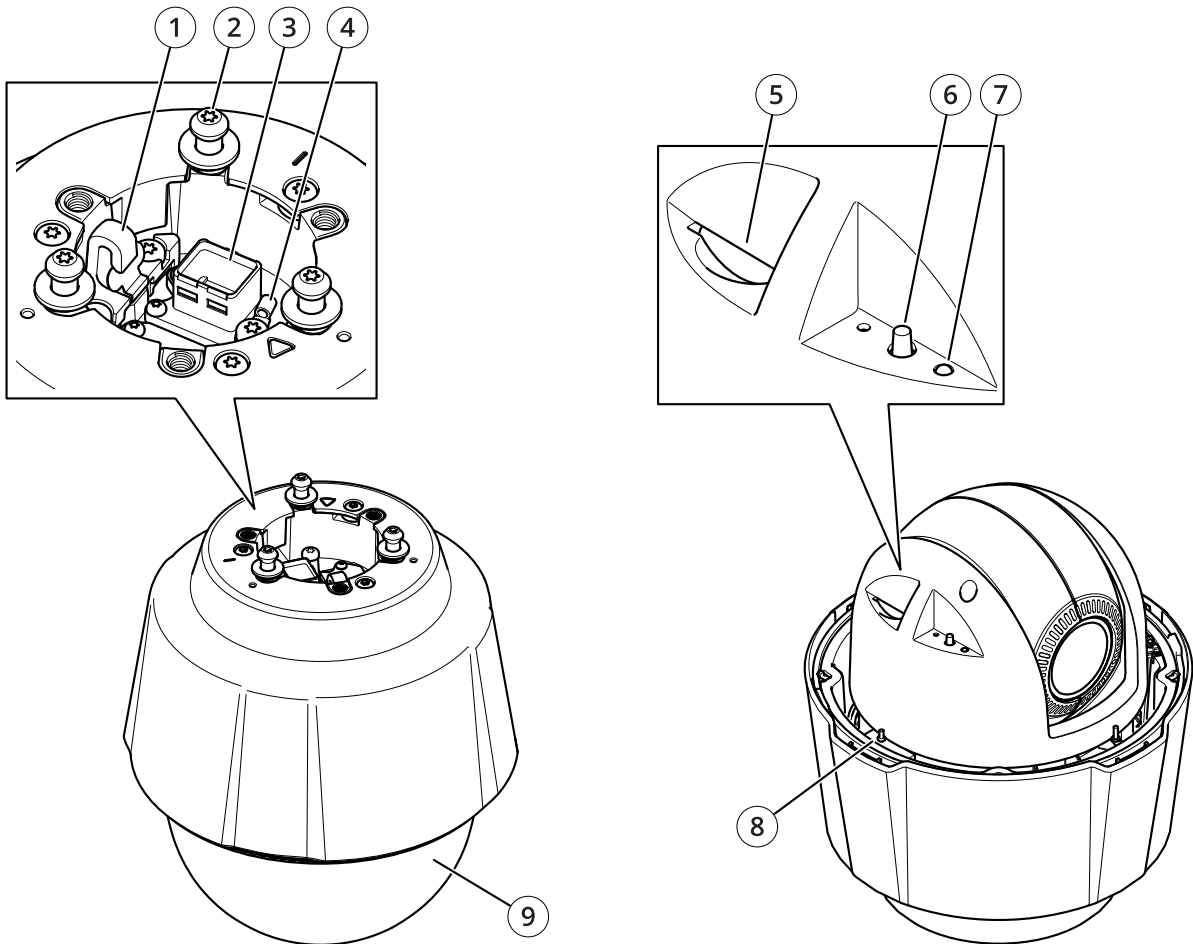
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# AXIS P5654-E Network Camera

## Product overview

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### Product overview



- 1 Hook for safety wire
- 2 Mounting screws (x3)
- 3 Network connector (PoE+)
- 4 Ground screw
- 5 SD memory card slot
- 6 Control button
- 7 Status LED indicator
- 8 Power button
- 9 Dome

# AXIS P5654-E Network Camera

## Installation

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### Installation



To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10170649](http://www.axis.com/products/online-manual/50469#t10170649)

*Installation video for the product.*

# AXIS P5654-E Network Camera

## Find the device on the network

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### Find the device on the network

To find Axis devices on the network and assign them IP addresses in Windows®, use AXIS IP Utility or AXIS Device Manager. Both applications are free and can be downloaded from [axis.com/support](http://axis.com/support).

For more information about how to find and assign IP addresses, go to *How to assign an IP address and access your device*.

### Access the device

1. Open a browser and enter the IP address or host name of the Axis device.  
If you do not know the IP address, use AXIS IP Utility or AXIS Device Manager to find the device on the network.
2. Enter the username and password. If you access the device for the first time, you must set the root password. See *Set a new password for the root account on page 5*.
3. The live view page opens in your browser.

### Secure passwords

#### Important

Axis devices send the initially set password in clear text over the network. To protect your device after the first login, set up a secure and encrypted HTTPS connection and then change the password.

The device password is the primary protection for your data and services. Axis devices do not impose a password policy as they may be used in various types of installations.

To protect your data we strongly recommend that you:

- Use a password with at least 8 characters, preferably created by a password generator.
- Don't expose the password.
- Change the password at a recurring interval, at least once a year.

### Set a new password for the root account

#### Important

The default administrator username is **root**. If the password for root is lost, reset the device to factory default settings. See *Reset to factory default settings on page 17*



To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10098905](http://www.axis.com/products/online-manual/50469#t10098905)

*Support tip: Password security confirmation check*

1. Type a password. Follow the instructions about secure passwords. See *Secure passwords on page 5*.

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## Find the device on the network

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2. Retype the password to confirm the spelling.
3. Click **Create login**. The password has now been configured.

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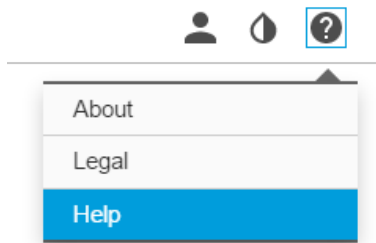
## Additional settings

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### Additional settings

#### Need more help?

You can access the built-in help from the device's webpage. The help provides more detailed information on the device's features and their settings.



#### Image quality

##### Adjust the focus faster with focus recall areas

To save the focus settings at a specific pan/tilt range, add a focus recall area. Each time the camera moves into that area it recalls the previously saved focus. It's enough to cover half of the focus recall area in the live view.

We recommend the focus recall feature in the following scenarios:

- When there is a lot of manual operation in live view, for example with a joystick.
- Where PTZ preset positions with manual focus are not efficient, for example movements where the focus setting changes continuously.
- In low-light scenarios, where the autofocus is challenged by the lighting conditions.

##### Important

- The focus recall overrides the camera's autofocus at the specific pan/tilt range.
- A preset position overrides the focus setting saved in the focus recall area.
- The maximum number of focus recall areas is 20.

##### Create a focus recall area


1. Pan, tilt, and zoom into the area where you would like to have focus.

As long as the focus recall button shows a plus  , you can add a focus recall area in that position.

2. Adjust the focus.
3. Click the focus recall button.

##### Delete a focus recall area

1. Pan, tilt, and zoom into the focus recall area you want to delete.

The focus recall button toggles to minus when the camera detects a focus recall area:  .

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## Additional settings

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2. Click the focus recall button.

### Handle scenes with strong backlight

Dynamic range is the difference in light levels in an image. In some cases the difference between the darkest and the brightest areas can be significant. The result is often an image where either the dark or the bright areas are visible. Wide dynamic range (WDR) makes both dark and bright areas of the image visible.



*Image without WDR.*



*Image with WDR.*

#### Note

- WDR can cause artifacts in the image.
  - WDR may not be available for all capture modes.
1. Go to **Settings > Image > Wide dynamic range**.
  2. Turn on WDR.
  3. Use the **Local contrast** slider to adjust the amount of WDR.
  4. If you still have problems, go to **Exposure** and adjust the **Exposure zone** to cover the area of interest.

Find out more about WDR and how to use it at [axis.com/web-articles/wdr](https://axis.com/web-articles/wdr).

### Hide parts of the image with privacy masks

You can create one or several privacy masks to hide parts of the image.



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## Additional settings

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To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10106902](http://www.axis.com/products/online-manual/50469#t10106902)

*How to create a privacy mask*

1. Go to **Settings > Privacy mask**.
2. Click **New**.
3. Adjust the size, color, and name of the privacy mask according to your needs.



To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10106902](http://www.axis.com/products/online-manual/50469#t10106902)

*How to change the appearance of the mask*

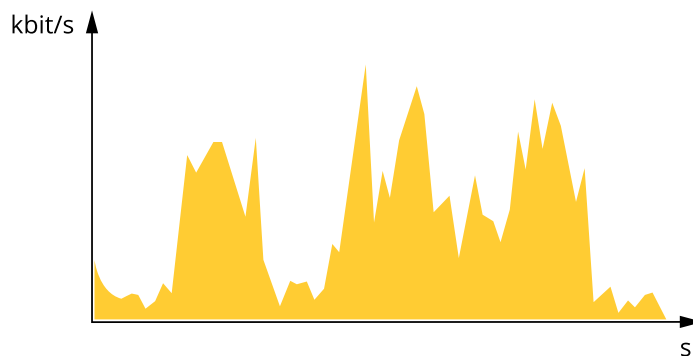
## Streaming and storage

### Bitrate control

With bitrate control, you can manage the bandwidth consumption of your video stream.

#### Variable bitrate (VBR)

With variable bitrate, the bandwidth consumption varies based on the level of activity in the scene. The more activity in the scene, the more bandwidth you need. You are guaranteed constant image quality but it requires storage margins.



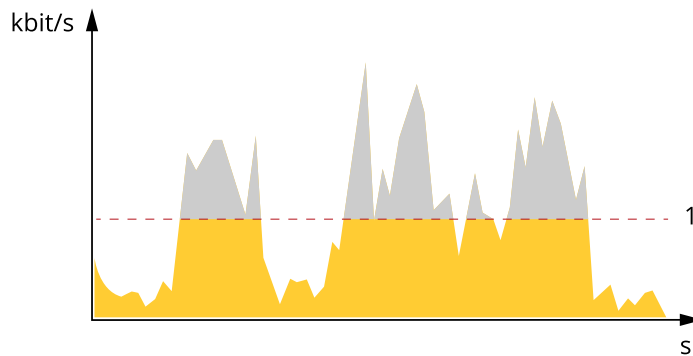
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## Additional settings

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### Maximum bitrate (MBR)

With maximum bitrate, you can set a target bitrate to handle bitrate limitations in your system. You may see a decline in image quality or frame rate when the instantaneous bitrate is kept below the specified target bitrate. You can choose to either prioritize image quality or frame rate. We recommend that you configure the target bitrate to a higher value than the expected bitrate. This gives you a margin for additional complexity that needs to be captured.

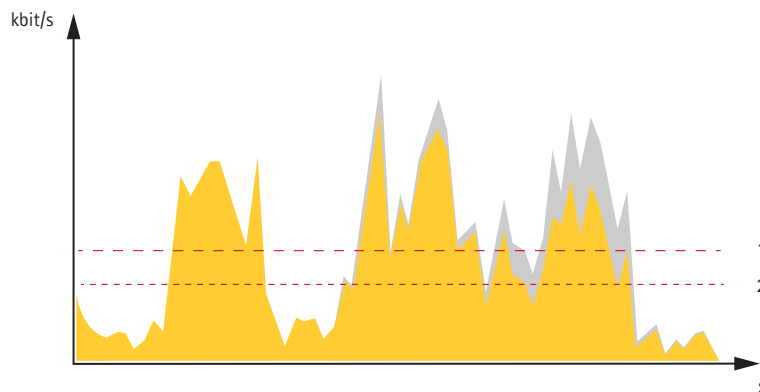


1 Target bitrate

### Average bitrate (ABR)

With average bitrate, the bitrate is automatically adjusted over a longer timescale. This is so you can meet the specified target and provide the best video quality based on your available storage. Bitrate is higher in scenes with a lot of activity, compared to static scenes. You are more likely to get better image quality when needed when using the average bitrate option. You can define the total storage required to store the video stream for a specified amount of time (retention time) when image quality is adjusted to meet the specified target bitrate. Specify the average bitrate settings in one of the following ways:

- To calculate the estimated storage need, set the target bitrate and the retention time.
- To calculate the average bitrate, based on available storage and required retention time, use the target bitrate calculator.



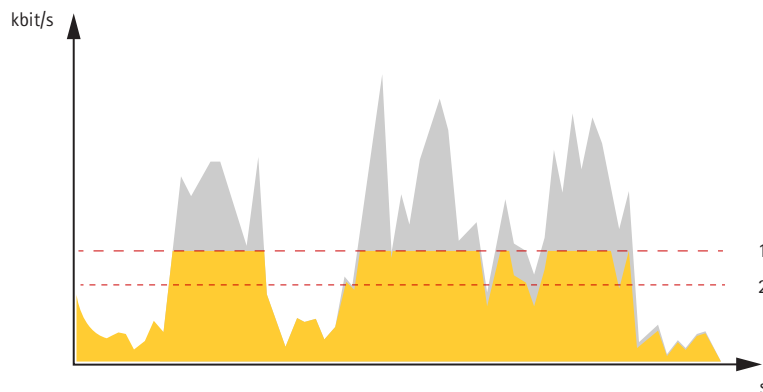
1 Target bitrate  
2 Actual average bitrate

You can also turn on maximum bitrate and specify a target bitrate within the average bitrate option.

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## Additional settings

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- 1 Target bitrate
- 2 Actual average bitrate

### Video compression formats

Decide which compression method to use based on your viewing requirements, and on the properties of your network. The available options are:

#### Motion JPEG

Motion JPEG, or MJPEG, is a digital video sequence that is made up of a series of individual JPEG images. These images are then displayed and updated at a rate sufficient to create a stream that shows constantly updated motion. For the viewer to perceive motion video the rate must be at least 16 image frames per second. Full motion video is perceived at 30 (NTSC) or 25 (PAL) frames per second.

The Motion JPEG stream uses considerable amounts of bandwidth, but provides excellent image quality and access to every image contained in the stream.

#### H.264 or MPEG-4 Part 10/AVC

##### Note

H.264 is a licensed technology. The Axis product includes one H.264 viewing client license. To install additional unlicensed copies of the client is prohibited. To purchase additional licenses, contact your Axis reseller.

H.264 can, without compromising image quality, reduce the size of a digital video file by more than 80% compared to the Motion JPEG format and by as much as 50% compared to the MPEG-4 standard. This means that less network bandwidth and storage space are required for a video file. Or seen another way, higher video quality can be achieved for a given bitrate.

#### H.265 or MPEG-H Part 2/HEVC

##### Note

H.265 is licensed technology. The Axis product includes one H.265 viewing client license. To install additional unlicensed copies of the client is prohibited. To purchase additional licenses, contact your Axis reseller.

### Reduce bandwidth and storage

##### Important

If you reduce the bandwidth it can result in loss of details in the picture.

1. Go to live view and select H.264.
2. Go to **Settings > Stream**.
3. Do one or more of the following:
  - Turn on the Zipstream functionality and select the desired level.

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### Note

The zipstream settings are used for both H.264 and H.265.

- Turn on dynamic GOP and set a high GOP length value.
- Increase the compression.
- Turn on dynamic FPS.

### Note

Web browsers do not support H.265 decoding. Use a video management system or application supporting H.265 decoding.

## Overlays

Overlays are superimposed over the video stream. They are used to provide extra information during recordings, such as a timestamp, or during product installation and configuration. You can add either text or an image.

### Show the pan or tilt position as a text overlay

You can show the pan or tilt position as an overlay in the image.

1. Go to **Settings > Overlay** and click **Create overlay**.
2. Select **Text** and click **Create**.
3. In the text field, type #x to show the pan position.  
Type #y to show the tilt position.
4. Choose appearance, text size, and alignment.
5. Include the text overlay.
6. The current pan and tilt positions show up in the live view image and in the recording.

## Pan, tilt, and zoom (PTZ)

### Limit the pan, tilt, and zoom movements


If there are parts of the scene that you don't want the camera to reach, you can limit the pan, tilt, and zoom movements. For example, you want to protect the privacy of residents in an apartment building, which is located close to a parking lot that you intend to monitor. To limit the movements, go to **Settings > PTZ > Limits**.

### Guard tours

A guard tour displays the video stream from different preset positions either in a predetermined or random order, and for configurable periods of time. Once started, a guard tour continues to run until stopped, even when there are no clients (web browsers) viewing the images.

#### Create a guard tour with preset positions

A guard tour displays the video stream from different preset positions either in a predetermined or random order, and for configurable periods of time.

1. Go to **Settings > PTZ > Guard tours**.
2. Click **+**.
3. To edit the guard tour's properties, click  .

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## Additional settings

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4. Type a name for the guard tour and specify the pause length in minutes between each tour.
5. If you want the guard tour to go to the preset positions in a random order, turn on **Shuffle**.
6. Click **Done**.
7. Click **Add** to add the preset positions that you want in your guard tour.
8. Click **Done** to exit the guard tour settings.
9. To schedule the guard tour, go to **System > Events**.



To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10111157](http://www.axis.com/products/online-manual/50469#t10111157)

## Events

### Set up rules and alerts

You can create rules to make your device perform an action when certain events occur. A rule consists of conditions and actions. The conditions can be used to trigger the actions. For example, the device can start a recording or send an email when it detects motion, or show an overlay text while the device is recording.

### Direct the camera to a preset position when the camera detects motion

This example explains how to set up the camera to go to a preset position when it detects motion in the image.



To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10101129](http://www.axis.com/products/online-manual/50469#t10101129)

Make sure that AXIS Video Motion Detection is running:

1. Go to **Settings > Apps > AXIS Video Motion Detection**.
2. Start the application if it is not already running.
3. Make sure you have set up the application according to your needs. If you need help, see the *user manual for AXIS Video Motion Detection 4*.

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## Additional settings

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Add a preset position:

Go to **Settings > PTZ** and set where you want the camera to be directed by creating a preset position.

Create a rule:

1. Go to **Settings > System > Events > Rules** and add a rule.
2. Type a name for the rule.
3. In the list of conditions, select a video motion detection condition under **Application**.
4. From the list of actions, select **Go to preset position**.
5. Select the preset position you want the camera to go to.
6. Click **Save**.

### Zoom in on a specific area automatically with gatekeeper

This example explains how to use the gatekeeper functionality to make the camera zoom in automatically on the license plate of a car that passes through a gate. When the car has passed, the camera zooms out to the home position.

Create the preset positions:

1. Go to **Settings > PTZ > Preset positions**.
2. Create the home position that includes the entrance of the gate.
3. Create the zoomed-in preset position so that it covers the area in the image where you assume that the license plate will appear.

Create a motion detection profile:

1. Go to **Settings > Apps** and open **AXIS Video Motion Detection**.
2. Create a profile that covers the entrance of the gate and then save the profile.

Create a rule:

1. Go to **Settings > System > Events** and add a rule.
2. Name the rule "Gatekeeper".
3. In the list of conditions, under **Application**, select the motion detection profile.
4. In the list of actions, under **Preset positions**, select **Go to preset position**.
5. Select a **Video channel**.
6. Select the **Preset position**.
7. To make the camera wait a while before it returns to the home position, select **Home timeout**, and set a time.
8. Click **Save**.

### Record video when the camera detects impact

Shock detection allows the camera to detect tampering caused by vibrations or shock. Vibrations due to the environment or to an object can trigger an action depending on the shock sensitivity range, which can be set from 0 to 100. In this scenario, someone is throwing rocks at the camera after hours and you would like to get a video clip of the event.

Turn on shock detection:

1. Go to **Settings > System > Detectors**.

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## Additional settings

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2. Turn on shock detection, and set a value for the shock sensitivity.

Create a rule:

1. Go to **Settings > System > Events** and add a rule.
2. Type a name for the rule.
3. In the list of conditions, under **Device status**, select **Shock detected**.
4. Click **+** to add a second condition.
5. In the list of conditions, under **Scheduled and recurring**, select **Scheduled event**.
6. In the list of schedules, select **After hours**.
7. In the list of actions, under **Recordings**, select **Record video while the rule is active**.
8. Select a **Camera**.
9. Set the prebuffer time to 5 seconds.
10. Set the postbuffer time to 60 seconds.
11. Select where to save the recordings.
12. Click **Save**.

## Applications

AXIS Camera Application Platform (ACAP) is an open platform that enables third parties to develop analytics and other applications for Axis products. To find out more about available applications, downloads, trials and licenses, go to [axis.com/applications](http://axis.com/applications).

To find the user manuals for Axis applications, go to [axis.com](http://axis.com).

### Note

- Several applications can run at the same time but some applications might not be compatible with each other. Certain combinations of applications might require too much processing power or memory resources when run in parallel. Verify that the applications work together before deployment.



To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10001688](http://www.axis.com/products/online-manual/50469#t10001688)

*How to download and install an application*

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## Additional settings

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To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10001688](http://www.axis.com/products/online-manual/50469#t10001688)

*How to activate an application licence code on a device*



# AXIS P5654-E Network Camera

## Troubleshooting

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### Troubleshooting

#### Reset to factory default settings

**Important**

Reset to factory default should be used with caution. A reset to factory default resets all settings, including the IP address, to the factory default values.

To reset the product to the factory default settings:


1. Press and hold the control button and the power button for 15–30 seconds until the status LED indicator flashes amber. See *Product overview on page 3*.
2. Release the control button but continue to hold down the power button until the status LED indicator turns green.
3. Release the power button and assemble the product.
4. The process is now complete. The product has been reset to the factory default settings. If no DHCP server is available on the network, the default IP address is 192.168.0.90.
5. Using the installation and management software tools to assign an IP address, set the password and access the video stream.

It is also possible to reset parameters to factory default through the web interface. Go to **Settings > System > Maintenance** and click **Default**.

#### Check the current firmware

Firmware is the software that determines the functionality of network devices. One of your first actions when troubleshooting a problem should be to check the current firmware version. The latest version may contain a correction that fixes your particular problem.

To check the current firmware:

1. Go to the product's webpage.
2. Click the help menu .
3. Click **About**.

#### Upgrade the firmware

**Important**

Preconfigured and customized settings are saved when the firmware is upgraded (provided that the features are available in the new firmware) although this is not guaranteed by Axis Communications AB.

**Important**

Make sure the cover is attached during upgrade to avoid installation failure.

**Important**

Make sure the product remains connected to the power source throughout the upgrade process.

**Note**

When you upgrade the product with the latest firmware in the active track, the product receives the latest functionality available. Always read the upgrade instructions and release notes available with each new release before upgrading the firmware. To find the latest firmware and the release notes, go to [axis.com/support/firmware](https://axis.com/support/firmware).

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## Troubleshooting

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AXIS Device Manager can be used for multiple upgrades. Find out more at [axis.com/products/axis-device-manager](http://axis.com/products/axis-device-manager).



To watch this video, go to the web version of this document.

[www.axis.com/products/online-manual/50469#t10095327](http://www.axis.com/products/online-manual/50469#t10095327)

*How to upgrade the firmware*

1. Download the firmware file to your computer, available free of charge at [axis.com/support/firmware](http://axis.com/support/firmware).
2. Log in to the product as an administrator.
3. Go to **Settings > System > Maintenance**. Follow the instructions on the page. When the upgrade has finished, the product restarts automatically.

## Technical issues, clues and solutions

If you can't find what you're looking for here, try the troubleshooting section at [axis.com/support](http://axis.com/support).

### Problems upgrading the firmware

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Firmware upgrade failure	If the firmware upgrade fails, the device reloads the previous firmware. The most common reason is that the wrong firmware file has been uploaded. Check that the name of the firmware file corresponds to your device and try again.
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### Problems setting the IP address

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The device is located on a different subnet	If the IP address intended for the device and the IP address of the computer used to access the device are located on different subnets, you cannot set the IP address. Contact your network administrator to obtain an IP address.
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The IP address is being used by another device	Disconnect the Axis device from the network. Run the ping command (in a Command/DOS window, type <code>ping</code> and the IP address of the device): <ul style="list-style-type: none"><li>• If you receive: <code>Reply from &lt;IP address&gt;: bytes=32; time=10...</code> this means that the IP address may already be in use by another device on the network. Obtain a new IP address from the network administrator and reinstall the device.</li><li>• If you receive: <code>Request timed out</code>, this means that the IP address is available for use with the Axis device. Check all cabling and reinstall the device.</li></ul>
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Possible IP address conflict with another device on the same subnet	The static IP address in the Axis device is used before the DHCP server sets a dynamic address. This means that if the same default static IP address is also used by another device, there may be problems accessing the device.
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### The device cannot be accessed from a browser

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Cannot log in	When HTTPS is enabled, ensure that the correct protocol (HTTP or HTTPS) is used when attempting to log in. You may need to manually type <code>http</code> or <code>https</code> in the browser's address field.
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If the password for the user `root` is lost, the device must be reset to the factory default settings. See *Reset to factory default settings on page 17*.

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## Troubleshooting

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The IP address has been changed by DHCP	IP addresses obtained from a DHCP server are dynamic and may change. If the IP address has been changed, use AXIS IP Utility or AXIS Device Manager to locate the device on the network. Identify the device using its model or serial number, or by the DNS name (if the name has been configured).  If required, a static IP address can be assigned manually. For instructions, go to <a href="http://axis.com/support">axis.com/support</a> .
Certificate error when using IEEE 802.1X	For authentication to work properly, the date and time settings in the Axis device must be synchronized with an NTP server. Go to <b>Settings &gt; System &gt; Date and time</b> .

### The device is accessible locally but not externally

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To access the device externally, we recommend using one of the following applications for Windows®:

- AXIS Companion: free of charge, ideal for small systems with basic surveillance needs.
- AXIS Camera Station: 30-day trial version free of charge, ideal for small to mid-size systems.

For instructions and download, go to [axis.com/vms](http://axis.com/vms).

### Problems with streaming

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Multicast H.264 only accessible by local clients	Check if your router supports multicasting, or if the router settings between the client and the device need to be configured. The TTL (Time To Live) value may need to be increased.
No multicast H.264 displayed in the client	Check with your network administrator that the multicast addresses used by the Axis device are valid for your network.  Check with your network administrator to see if there is a firewall preventing viewing.
Poor rendering of H.264 images	Ensure that your graphics card is using the latest driver. The latest drivers can usually be downloaded from the manufacturer's website.
Color saturation is different in H.264 and Motion JPEG	Modify the settings for your graphics adapter. Go to the adapter's documentation for more information.
Lower frame rate than expected	<ul style="list-style-type: none"><li>• See <i>Performance considerations on page 19</i>.</li><li>• Reduce the number of applications running on the client computer.</li><li>• Limit the number of simultaneous viewers.</li><li>• Check with the network administrator that there is enough bandwidth available.</li><li>• Lower the image resolution.</li></ul>
Can't select H.265 encoding in live view	Web browsers do not support H.265 decoding. Use a video management system or application supporting H.265 decoding.

## Performance considerations

When setting up your system, it is important to consider how various settings and situations affect the performance. Some factors affect the amount of bandwidth (the bitrate) required, others can affect the frame rate, and some affect both. If the load on the CPU reaches its maximum, this also affects the frame rate.

The following factors are the most important to consider:

- High image resolution or lower compression levels result in images containing more data which in turn affects the bandwidth.
- Rotating the image in the GUI will increase the product's CPU load.
- Removing or attaching the cover will restart the camera.
- Access by large numbers of Motion JPEG or unicast H.264 clients affects the bandwidth.
- Simultaneous viewing of different streams (resolution, compression) by different clients affects both frame rate and bandwidth.

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## Troubleshooting

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Use identical streams wherever possible to maintain a high frame rate. Stream profiles can be used to ensure that streams are identical.

- Accessing Motion JPEG and H.264 video streams simultaneously affects both frame rate and bandwidth.
- Heavy usage of event settings affects the product's CPU load which in turn affects the frame rate.
- Using HTTPS may reduce frame rate, in particular if streaming Motion JPEG.
- Heavy network utilization due to poor infrastructure affects the bandwidth.
- Viewing on poorly performing client computers lowers perceived performance and affects frame rate.
- Running multiple AXIS Camera Application Platform (ACAP) applications simultaneously may affect the frame rate and the general performance.

# AXIS P5654-E Network Camera

## Specifications

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### Specifications

#### LED indicators

Status LED	Indication
Unlit	Connection and normal operation.
Green	Shows steady green for 10 seconds for normal operation after startup completed.
Amber	Steady during startup. Flashes during firmware upgrade or reset to factory default.
Amber/Red	Flashes amber/red if network connection is unavailable or lost.

#### SD card slot

##### **NOTICE**

- Risk of damage to SD card. Do not use sharp tools, metal objects, or excessive force when inserting or removing the SD card. Use your fingers to insert and remove the card.
- Risk of data loss and corrupted recordings. Do not remove the SD card while the product is running. Unmount the SD card from the product's webpage before removal.

This product supports SD/SDHC/SDXC cards.

For SD card recommendations, see [axis.com](http://axis.com).



SD, SDHC, and SDXC Logos are trademarks of SD-3C LLC. SD, SDHC and SDXC are trademarks or registered trademarks of SD-3C, LLC in the United States, other countries or both.

#### Buttons

##### Control button

The control button is used for:

- Resetting the product to factory default settings. See *Reset to factory default settings on page 17*.

##### Power button

Press and hold the power button to temporarily power the product when the dome cover is removed. The power button is also used with the control button to reset the camera to factory default settings. See *page 17*.

#### Connectors

##### Network connector

RJ45 Ethernet connector with Power over Ethernet Plus (PoE+).

